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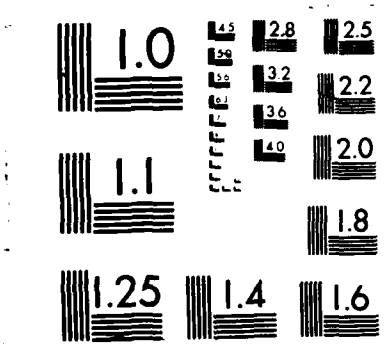

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The view, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

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Elastomers — NMR characterization — Siloxanes
Vulcanization — Toughness — Silica
Block copolymers — Gels — Adhesion

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

This is a report of the chairman's observations on the 1986 Gordon Research Conference on Elastomers. A copy of the complete program, listing the discussion leaders, speakers, affiliations, and lecture titles, is attached as part of this report.

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Report on the 1986 Gordon Research Conference on Elastomers

This conference on elastomers is held annually, in New London, NH. Attendance is limited to scientists and engineers active in this area, and presentations are by invitation only. The emphasis is on very new results, even those that are highly speculative, and much of the time is devoted to discussions, both public and private.

At the 1986 Conference, attendees were from a wide variety of institutions, representing industry, government, and academia. Most were from the United States, but there were representatives from Canada, France, Belguim, Turkey, People's Republic of China, and Japan. Specific information on the discussion leaders, speakers, and topics is given in the attached copy of the program.

There was considerable emphasis ~~this~~ year on block copolymers and other types of multi-phase systems. Specific subjects included their synthesis, structure, morphology, properties, advantages, and disadvantages. Two other types of elastomers emphasized were semi-inorganic in nature, specifically the phosphazenes and silicones. Organophosphazene elastomers were discussed in detail, as was the hydrosilylation cure of elastomers, particularly the silicone type.

Several ways of improving the anionic polymerization of α-methylstyrene were discussed, and then the use of such sequences in thermoplastic elastomers. Two other types of thermoplastic elastomers, covered in other talks, were based on modified diene

polymers and on polydiphenylsiloxane sequences. A final contribution in the organic area involved the anionic polymerization of polar monomers, some of which are of interest in the elastomers area.

Methods for determining the state of cure in an elastomer were discussed, as was the use of NMR spectroscopy to characterize the structure of cured elastomeric materials. Other general topics were phase transitions in gels (both from the experimental and theoretical points of view), and the characterization of sequence orientation in deformed elastomers.

A rather different, unusual subject was the study of bioelastomers. The importance of this work is the guidance one can obtain from nature in the design of more efficient elastomeric materials.

The remaining presentations focused on more applied problems. These included silica fillers in elastomers, adhesion problems, and tire-wear models.

The program seemed to be well received by the attendees.

PROGRAM FOR THE 1986 GORDON RESEARCH CONFERENCE ON ELASTOMERS

Monday, July 14

Morning: D. N. Schulz (Exxon), Discussion Leader

L. H. Tung (Dow Chemical), "Diene Triblock Polymers with Styrene-α-methylstyrene Copolymer End Blocks"

J. C. Saam (Dow Corning), "Hydrosilylation Cure in Elastomers"

Evening: J. T. Books (Ethyl Corp.), Discussion Leader

G. L. Hagnauer, M. Sennett, and R. A. Singler (Army Mat. Mech. Res. Ctr.), "Polyphosphazene Elastomers"

J. Lal (Retired from The Goodyear Tire & Rubber Company), "Thermoplastic Elastomers by Selective Modifications of Diene Block Copolymers"

Tuesday, July 15

Morning: A. Crowson (U.S. Army Research Office), Discussion Leader

P. Teyssie (Univ. of Liege), "Living Anionic Polymerization of Acrylates and Resulting New Products" WITHDRAWN

G. Huynh-Ba (Va. Polytech. Inst.), "Pyridine-Assisted Anionic Polymerization and Copolymerization of Polar Monomers"

J. M. Vergnaud (Univ. de Saint-Etienne), "Determination of the State of Cure of Vulcanizates from the Heat Evolved During Reaction"

Evening: R. W. Brotzman (City Univ. of New York), Discussion Leader

J. L. Koenig (Case-Western Reserve Univ.), "Recent Advances in Sulfur Vulcanization of Elastomers Using High-Resolution Solid ^{13}C NMR"

T. Nishi (Univ. of Tokyo), "Pulsed NMR Studies of Elastomer Systems"

Wednesday, July 16

Morning: B. E. Eichinger (Univ. of Washington), Discussion Leader

T. Tanaka (MIT), "Kinetics of Phase Transitions of Gels"

B. Erman (Bogazici Univ., Istanbul), "Critical Phenomena and Transitions in Swollen Polymer Networks"

L. Monnerie (Ecole Physique et Chimie, Paris) "Investigation of Chain Orientation in Stretched Elastomer Networks by Fluorescence Polarization"

Evening: S. Krause (Rensselaer Polytech.), Discussion Leader

D. L. Handlin, Jr. (Shell Dev. Co.), "Structure-Property Relationships of Triblock and Star-Diblock Copolymers"

B. Epstein, D. D. Huang, and J. G. Williams (Du Pont), "Measurement of Toughness of Toughened Polymers"

Thursday, July 17

Morning: R. E. Cohen (MIT), Discussion Leader

D. J. Meier (Midland Molecular Inst.), "Synthesis and Properties of Siloxane Block Copolymers"

G. Li (Chinese Acad. Sci.), "Studies on the Interaction of Silica and Polyorganosiloxanes"

Evening: J. E. Mark (Univ. of Cincinnati), Discussion Leader

J. Gosline (Univ. of British Columbia), "The Elastomeric Properties of Some Spider's Silks"

Friday, July 18 E. N. Kresge (Exxon), Discussion Leader

G. R. Hamed (Univ. of Akron), "Autohesion and Cohesion of Uncross-linked Elastomers"

D. I. Livingston (Goodyear), "Tire-Wear Model"

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